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EXAMINER	
KARDOS, NEIL R	
ART UNIT	**PAPER NUMBER**
3623	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/715,170	JAIN ET AL.	
	Examiner	**Art Unit**	
	NEIL R. KARDOS	3623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 November 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-9,15-22,24-29 and 35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-9,15-22,24-29 and 35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This is a **FINAL** Office Action on the merits in response to communications filed on November 2, 2010. Currently, claims 1-9, 15-22, 24-29, and 35 are pending and have been examined.

Response to Amendment

Applicant's amendments to the claims are sufficient to overcome the § 101 rejections set forth in the previous Office action. Accordingly, the § 101 rejections have been withdrawn.

Response to Arguments

Applicant's arguments filed on November 2, 2010 have been fully considered but they are not persuasive. Applicant argues that Williamson in view of Kodialam does not teach or suggest "a component that receives a user input for a selection of at least one of the subset of data to bias at least one edge utilized to resolve a graph representation of a network, the at least one of the subset of data associated with one or more of cost, length, bandwidth, or latency." Examiner respectfully disagrees. Kodialam discloses this limitation.

Kodialam discloses inputting a "directed graph G_w = (N, E) with a set of edge costs associated with E." (See column 14: lines 8-9; see also column 13: lines 30-43). This recitation alone teaches the claimed limitation because it shows a user input of a cost used to bias edges in a directed graph.

Kodialam also discloses "generating a weighted graph G_w representing the original network in which the critical links have weights that are an increasing function of their relative

importance, or "criticality," to the network." (See column 12: lines 15-21). The criticality of the link can be representative of, e.g., cost (see column 11: line 63 through column 12: line 11), capacity/bandwidth (see column 7: lines 60-67), distance/length (see column 13: lines 40-43), or delay/latency (see column 6: lines 4-13). Thus, Kodialam discloses a subset of data to bias at least one edge (Kodialam's weighted links) utilized to resolve a graph representation of a network (Kodialam's weighted graph, G_w), the at least one of the subset of data associated with one or more of cost, length, bandwidth, or latency (Kodialam's cost, capacity, distance, and packet delay). Kodialam also discloses that the subset of data (associated with one or more of cost, length, bandwidth, or latency) is input by a user. (See figure 4: item 401, disclosing receiving a network G(N,A) with corresponding arc capacities; column 9: lines 1-10 and 59-61; column 13: lines 20-43; column 14: lines 8-9). Thus, Kodialam teaches the claimed limitation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 2, and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson, "A Primal-Dual Approximation Algorithm for Generalized Steiner Network Problems" in view of Kodialam (US 6,778,531).

Claim 1: Williamson discloses:

- receiving a subset of data corresponding to a linear program (see page 708: Introduction, disclosing given data for a linear program, including an undirected graph, a non-negative cost function, a function, and the set of edges having exactly one endpoint in a set);
- adapting linear programming optimization algorithms, based on separation oracles (see page 709: column 1: full paragraphs 1-2, disclosing separation oracle f; see also page 709: column 2: paragraph 2, disclosing satisfying f in phases), to work with an approximate separation oracle (see id.) and information related to a subset of data to solve a primal and dual linear program (see page 709: column 1: full paragraph 3 through column 2: paragraph 1, disclosing solving primal and dual LPs; page 710: section 2, disclosing a primal-dual method for approximation algorithms) within a same approximation factor as the approximate separation oracle (see page 710: column 2, disclosing "Thus the primal solution found is within a factor of a of the optimal primal LP solution, and therefore also within a factor of a of the optimal solution to (IP)"; see also page 709: column 1: first full paragraph, disclosing a solution within a factor of 2k of the optimal; page 711: column 1: final paragraph, disclosing "the dual solution found can be transformed into a feasible dual solution for the linear programming relaxation of (IP) of at least the same value", and also disclosing a factor of 2k).

Williamson does not explicitly disclose a component that receives a user input for a selection of at least one of the subset of data to bias at least one edge utilized to resolve a graph representative of a network, the at least one of the subset of data associated with one or more of

cost, length, bandwidth, or latency, nor does Williamson explicitly disclose a system comprising a server, processor, computer-readable storage medium, and components that perform the claimed methodology. However, Williamson at least suggests these limitations (see page 708: column 1: Introduction, disclosing finding a minimum-cost subgraph, and formulating an integer programming problem that incorporates a cost function c; page 708: column 2, disclosing minimum-cost subgraphs; page 709: column 1: third full paragraph, disclosing determining the shortest path in a network).

Kodialam explicitly discloses the above limitations (see figures 4-5, disclosing inputting data to a directed graph; column 6:lines 4-13, disclosing delay/latency; column 7: lines 52-67, disclosing modeling a network and including node capacities in the model; column 9: lines 1-10 and 59-61, disclosing inputting network topology into the model, including arc/link capacities (i.e. bandwidth); column 11: line 63 through column 12: line 11, disclosing minimizing delay (i.e. latency) and costs; column 12: lines 15-21, disclosing generating a weighted graph G_w representing the original network in which the critical links have weights that are an increasing function of their relative importance, or "criticality," to the network; column 13: lines 14-19 and 50-67, disclosing the shortest path computation; column 13: lines 20-43, disclosing inputting costs or distances between nodes; column 14: lines 8-9, disclosing inputting edge costs; column 15: lines 17-35, disclosing devices for performing the disclosed methods).

Williamson and Kodialam are both directed to optimal routing of information through a network. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the network considerations of Kodialam when performing the network optimization of Williamson. One of ordinary skill in the art would have been motivated to do so

for the benefit of a more accurate representation of the network, leading to a more optimal solution.

Claim 2: Williamson discloses resolving an optimization of the dual linear program to solve for an optimization of the primal linear program (see page 709: column 1: full paragraph 3 through column 2: paragraph 1, disclosing solving primal and dual LPs; page 710: section 2, disclosing a primal-dual method for approximation algorithms).

Claim 5: Williamson discloses the approximate separation oracle comprising an approximation algorithm for a minimum Steiner tree problem (see page 708: column 2: last paragraph, disclosing Steiner tree problems).

Claim 6: Williamson does not explicitly disclose the approximate separation oracle utilized in conjunction with an ellipsoid method to obtain a resolution for the primal and dual linear programs. Examiner takes Official Notice that it was well-known in the art at the time the invention was made to use the ellipsoid method to solve linear programs (see e.g. Karr, "Derivation of the Ellipsoid Algorithm"; Wikipedia: "ellipsoid method"). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ well-known techniques for solving linear programs (i.e. the ellipsoid algorithm) in order to solve the linear programs of Williamson. One of ordinary skill in the art would have been motivated to do so for the benefit of the accuracies and efficiencies associated with the ellipsoid method.

Claim 7: Williamson discloses the resolution producing an approximation algorithm for a fractional Steiner tree packing problem (see page 708: column 2: last paragraph, disclosing Steiner tree problems).

Claim 8: Williamson discloses utilizing primal and dual linear programs representative of a fractional Steiner tree packing problem (see page 708: column 2: last paragraph, disclosing Steiner tree problems).

Claim 9: Williamson discloses the primal linear program comprising a representation of an aspect of at least one computer network system (see page 708: column 2: second to last paragraph, disclosing "design of networks").

Claims 3, 4, 16-19, 21, 22, 24-29, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson in view of Kodialam, and further in view of Karr, "Derivation of the Ellipsoid Algorithm."

Claim 3: Williamson discloses the optimization of the dual linear program comprising an approximation range between R* and aR*; where a is the approximation factor (see page 710: column 2: equation (b')). Williamson does not explicitly disclose wherein R* is a minimum value produced by a binary search of an equality function produced via an ellipsoid algorithm utilizing the approximate separation oracle, although Williamson does suggest this limitation (see page 708: column 2, disclosing that f(S) = k; column 1: abstract, disclosing that k is the maximum cut requirement of the problem). Karr discloses this limitation (see at least page 4:

section 3; specifically, Lemma 3.2, defining the lower bound; page 5: section 3.2, disclosing the iterations to the lower boundary; page 6: figure 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the lower bound of Williamson to the minimum value disclosed by Karr. One of ordinary skill in the art would have been motivated to do so for the benefit of obtaining an accurate solution (see Karr: page 5: section 3.2: paragraph 1).

Furthermore, Examiner takes Official Notice that binary searches and the ellipsoid algorithm were well-known at the time the invention was made (see Wikipedia: "binary search algorithm" and "ellipsoid method"). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply well-known algorithms to the methodology of Williamson. One of ordinary skill in the art would have been motivated to do so for the benefit of the efficiencies associated with each algorithm.

Claim 4: Williamson discloses the optimization of the primal linear program comprising a value less than or equal to aR* (see page 710: column 2: equation (b') and subsequent text).

Claim 16: Claim 16 is substantially similar to elements of claims 1-3 and 5, and is rejected under similar rationale.

Claim 17: Claim 17 is substantially similar to elements of claims 1-3 and 5-8, and is rejected under similar rationale.

Claim 18: Williamson discloses the known approximation method comprising a polynomial time a-approximation algorithm for finding the minimum weight Steiner tree (see abstract).

Claim 19: Claim 19 is substantially similar to elements of claims 3-5 and is rejected under similar rationale.

Claims 21 and 22: Claims 21 and 22 are substantially similar to claim 9 and are rejected under similar rationale.

Claims 24-27: The cited references do not explicitly disclose utilizing the optimum distribution to efficiently transmit non-streaming data from a source node to a receiving node via the networked system. Nor do the cited references explicitly disclose incorporating a broadcast transmission. Kodialam discloses incorporating a multicast transmission or a unicast transmission by the source node. (See e.g. background of invention). Williamson also at least suggests these limitations (see page 708: column 2: second to last paragraph, disclosing "design of networks"). Furthermore, these limitations amount to an intended use and are insufficient to distinguish the claimed invention over the prior art because there is no manipulative difference between the claimed invention and the prior art. See MPEP 2111.02.

Claim 28: Claim 28 is substantially similar to elements of claims 1-3 and 5, and is rejected under similar rationale.

Claim 29: Claim 29 is substantially similar to claim 9 and is rejected under similar rationale.

Claim 35: Williamson does not explicitly disclose wherein the at least one parameter further comprises a bandwidth capacity of a plurality of links between a source node and one or more receiving nodes of the network; and wherein providing the optimal data dissemination for the network data route further comprises providing an optimal distribution path, based at least in part on the bandwidth capacity, for passing data from the source node to the one or more receiving nodes.

Kodialam discloses these limitations (see column 7: lines 52-66, disclosing modeling a network and including node capacities in the model; column 9: lines 1-10 and 59, disclosing inputting network topology into the model, including arc/link capacities; column 8: lines 57-67 and column 9, disclosing determining the tree that provides the maximum flow (i.e. the optimal route)). Williamson and Kodialam are both directed to optimal routing of information through a network. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the network considerations of Kodialam when performing the network optimization of Williamson. One of ordinary skill in the art would have been motivated to do so for the benefit of a more accurate representation of the network, leading to a more optimal solution.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson in view of Kodialam, and further in view of Hougardy, "A 1.598 Approximation Algorithm for the Steiner Problem in Graphs."

Claim 15: Williamson does not explicitly disclose an asymptotic approximation factor of about 1.59. Hougardy discloses this limitation (see title). It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the approximation factor of Hougardy to the approximations of Williamson. One of ordinary skill in the art would have been motivated to do so for the benefit of obtaining the most optimal solution.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Williamson in view of Kodialam, Karr and Hougardy.

Claim 20: Claim 20 is substantially similar to claim 15 and is rejected under similar rationale.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NEIL R. KARDOS whose telephone number is (571)270-3443. The examiner can normally be reached on Monday through Friday from 9 am to 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Beth Boswell can be reached on (571) 272-6737. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Neil R. Kardos
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